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ABSTRACT

The target population for this program was teachers, students, and community persons from seven public schools and one non-public school. It was designed to reach teachers, students, parents, and community members with the major focus on developing students' skills in using metric measurement. Teachers and lay people received their training in workshops, and were expected to help students develop metric skills. Teachers who participated in the 30-hour course in metric education showed significant growth in their knowledge of metric measurement. Seven of 13 community adults who completed the metric project workshops assisted teachers with their metric programs in two of the participating schools. Project teachers noted that 70% of the items on a checklist of application of metric skills and concepts were taught to their students. However, sufficient evidence was not available to indicate that students of teachers who participated in a metric course demonstrated increased knowledge. The one class for which data were available showed a significant gain on a teacher-designed instrument concerning metric measurement. (MP)

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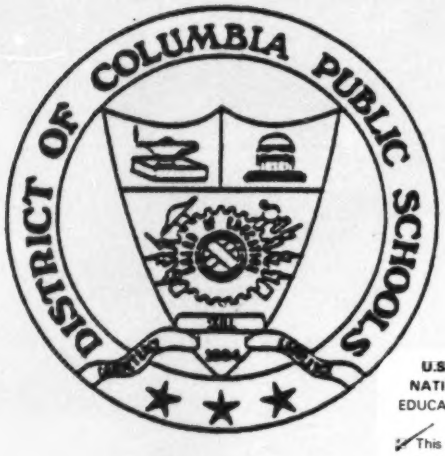

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MOVING TOWARD METRICATION WITH A METRIC CORPS

E. S. E. A. TITLE IV-C

Final Evaluation Report

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DISTRICT OF COLUMBIA PUBLIC SCHOOLS

MOVING TOWARD METRICATION WITH A METRIC CORPS

FINAL REPORT

1980-1981

Prepared by
Division of Quality Assurance

1980-1981

MOVING TOWARD METRICATION WITH A METRIC CORPS

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SUMMARY AND FINDINGS

Title

Moving Towards Metrication With A Metric Corps

Project Director

Sheila G. Handy

Project Location

Project headquarters and workshops were at Nalle Elementary School.

Target Population

The target population for this program were teachers, students and community persons from seven public schools (K-12) and one non-public school, all located in Region D.

Background

Region D, in line with the District of Colulmbia's "Policy on Metrication" worked on developing a comprehensive model for infusing metric education into the instructional program. This was done after a review of the objectives relating to metric education on the District's criterion referenced mathematics' test (PMT) revealed that fewer than 25% of the students tested showed mastery, and that 90% of surveyed school personnel stated a need for help in the use of the metric system.

Description of Project

The project was designed to reach teachers, students, parents and community members with the major focus on developing students' skills in using metric measurement. Teachers and parents/community people received their training in workshops. They, in turn, helped students develop metric skills.

Stated Objectives

A. Given an opportunity to participate in a metric education course, the metric corps teachers will demonstrate knowledge of the skills and concepts taught in the course, as measured by a significant increase from pre- to posttest on a course examination.

B. Given an opportunity to participate in a metric education course, the metric corps teachers will apply the skills and concepts taught in the course, as measured by at least 80% of the items checked off on a checklist designed by the project director and the external evaluators.

C. Students of teachers who participate in a metric education course will demonstrate increased knowledge of metric measurement as measured by a significant increase pre-to-post on a project developed multi-level instrument.

D. After having attended a workshop on metric concepts and skills, parents and community persons will demonstrate a positive attitude and interest toward metric measurement as measured by at least 80% of them indicating a more positive attitude on the posttest than on the pretest on a project-designed opinion survey and at least 25% of them assisting the schools in the implementation of the metric education program.

Evaluation

The evaluation follows the Planning, Monitoring and Implementation (PMI) model for decision-making which was developed by the Division of Quality Assurance.

Findings

1. After participating in a 30 hour course in metric education, teachers showed significant growth pre- to postesting in their knowledge of metric measurement.

2. All project school teams submitted to the project director copies of action plans for increasing metric education in their local schools and began implementing the plans.

3. On a checklist of application of metric skills and concepts, project teachers checked 70% of the items indicating having taught them. Intensive classroom instruction was late in being introduced during this first year of the project because the teacher in-service, a prerequisite to the introduction of the skills in the classroom, was not held until the Spring of 1981.

4. Sufficient evidence was not available to indicate that students of teachers who participated in a metric course, demonstrated increased knowledge of metric. One class for which data were available showed a significant gain pre- to posttesting on a teacher-designed instrument concerning metric measurement.

5. There was indication of more positive attitude toward metric education pre- to posttesting on all items of a project-designed opinion survey taken by volunteer parents and other community people who participated in a metric workshop.

6. Seven of the 13 adults who completed the metric project workshops assisted teachers with their metric programs in two of the participating schools.

BACKGROUND AND PROJECT OBJECTIVES

Introduction

Purpose -The purpose of the project, MOVING TOWARDS METRICATION WITH A METRIC CORPS, was to develop a comprehensive model for infusing metric education into the instructional program in order to fulfill the "Policy on Metrication" established by the District of Columbia Public Schools. The project prepared teachers, students and community persons to use the metric system of measurement with facility.

Need - The Competency-Based Curriculum made some provision for the development of metric measurement skills, but there was a need for a model to help students move from customary measurement to the use of metric measurement. In addition, of the few objectives related to metric measurement on the District of Columbia Public School's mathematics criterion referenced test, fewer than 25% of the students tested showed mastery. The model, therefore, needed to involve teachers and volunteer aides as well as students. In a survey of school personnel which included principals, teachers, cafeteria workers and engineers in former Region III, over 90% of the responses stated a need for help in acquiring knowledge of, and skills and competencies in the use of the metric system. Respondents stated that they did not feel comfortable with the metric system.

History - A metric training program was initially introduced to the system in the early nineteen seventies. On June 24, 1975 the "Policy on Metrication" was approved by the Board of Education projecting conversion to the metric system from pre-kindergarten to grade 12 over the following four years, with instruction to be systematically integrated into the total education program. Although metrication was being taught sporadically throughout the District, persons from former Region III, now Region D, initiated a proposal in 1979 to use a model where teachers would be trained to teach metric skills to other teachers, students and community helpers in eight targeted schools (seven public and one private) covering grades K-12. The program began in the fall of 1980.

Description of the Project

Target Population -Included in the project were students, teachers and other staff members from the following schools in Region D: Aiton, Burville, Harris, Merritt and Nalle Elementary Schools; Miller Junior High School; Anacostia Senior High School; and Nannie H. Burroughs private school. It was anticipated that approximately 1450 students would participate in the program. Five teachers from each school were invited to participate in the training and to train other teachers and staff members including counselors, librarians, supervisors, media specialists, open space coordinators and psychometrists. In addition, community people from the same area were invited to participate in their own training.

Metric Corps - Five teachers from each of the targeted public schools and two from the private were to be taught an off-campus course in metrication through the University of the District of Columbia at the Region D

Educational center, Nalle School, earning two semester hours of graduate credit. They were to form a metric corps to train other teachers in Region D both in their schools and in neighboring schools during phase 2 of the program.

Developing Students' Metric Skills - The information and skills learned by the teachers were to be passed on to the students. After the third session of the teacher training course, formal metric instruction of at least one hour per week was to occur. Students were to be taught to perform activities such as: naming and identifying the base units of linear metric measurement and the commonly used prefixes; relating base-ten numerical place values, names of metric units, and decimal values; converting one metric unit of length to another; naming and identifying the base units of mass measurement and capacity in the metric system; reading a celsius thermometer; and demonstrating the ability to apply metric measurement concepts to everyday life.

Developing Metric Skills of Parents and Community Persons - The third focus of the project was on encouraging a positive attitude and interest of parents and community persons toward metric measurement. A workshop was offered on metric concepts and skills. These trained persons were invited to participate as volunteer classroom aides in the metric education program in the schools.

Metric Resource Centers - A future plan for the program was to establish metric resource centers in each of the target schools. These centers were to become models for the other Region D schools and eventually for the whole system.

Stated Objectives

Objective A: Given an opportunity to participate in a metric education course, the metric corps teachers will demonstrate knowledge of the skills and concepts taught in the course, as measured by a significant increase from pre- to posttest on a course examination.

Objective B: Given an opportunity to participate in a metric education course, the metric corps teachers will apply the skills and concepts taught in the course, as measured by at least 80% of the items checked off on a checklist designed by the project director and the external evaluators.

Objective C: Students of teachers who participate in a metric education course will demonstrate increased knowledge of metric measurement as measured by a significant increase pre- to posttest on a project developed multi-level instrument.

Objective D: After having attended a workshop on metric concepts and skills, parents and community persons will demonstrate a positive attitude and interest toward metric measurement as measured by at least 80% indicating a more positive attitude on the posttest than on the pretest on a project-designed opinion survey and at least 25% of them assisting the schools in the implementation of the metric education program.

EXTERNAL EVALUATION DESIGN - PLANNING, MONITORING AND IMPLEMENTATION (PMI) MODEL FOR DECISION-MAKING

The evaluation follows the Planning, Monitoring, and Implementation (PMI) Model for Decision-Making which was developed by the Division of Quality Assurance, District of Columbia Public Schools. (See Appendix A.) The evaluation design consisted of the intended inputs, processes and outputs. The interim report related agreements or discrepancies between intended and observed inputs and processes. This final report includes the interim report data, the agreements and discrepancies between intended and observed outcomes with supporting data in the appendix, a summary of performance agreement and analysis/conclusions/implications, for each objective.

RESULTS

FINAL REPORT

PLANNING, MONITORING, AND IMPLEMENTATION (PMI)
EVALUATION MODEL FOR DECISION-MAKING

Reporting Form

Goal: To prepare teachers, students and community persons to use the metric system of measurement with facility.

Objective A: Given an opportunity to participate in a metric education course, the metric corps teachers will demonstrate knowledge of the skills and concepts taught in the course, as measured by a significant increase from pre- to posttest on a course examination.

PART I

INPUTS

INTENDED	STATUS	OBSERVED
1. Five teachers from each of the targeted schools to participate in the program	Discrepancy	1. Registration forms showed that five teachers from each of the targeted schools were selected to participate in the program. The 21 participants completing the course represented 6 schools with 2 to 5 members each. Other representatives attended several of the class sessions but did not complete the course.
2. Sufficient materials for all participants including metric kits, measuring instruments and reference materials	Discrepancy	2. Material that was ordered for this year was received after the school year ended. However, the project director informed the evaluation team that materials available in the schools and the regional educational center, which were observed by the team, were adequate to start the program.
3. Qualified mathematics instructor to teach the course	Agreement	3. A math resource teacher, who worked with the initial metric training program begun in the early 1970's by the Mathematics Department was hired to teach the course.

OBJECTIVE A

PART I (continued)

INPUTS

INTENDED	STATUS	OBSERVED
4. Pre-post assessment instrument to check knowledge of metric skills and concepts	Agreement	4. The pre-post assessment instrument was constructed and was reviewed by the evaluation team.

OBJECTIVE A

PART II

PROCESSES

INTENDED	STATUS	OBSERVED
1. Project teachers will attend a 30 hour course in metric education.	Agreement	1. The course outline and registration list were presented to the evaluation team. The course outline contained the title, objectives and schedule for the course. The course met during the period of February 23 to May 21 for three hours each week. One class was observed by the Evaluation Team.
2. Project teachers will take a pre-post assessment examination.	Agreement	2. The project teachers took the pre- and posttest as evidenced by the examinations on file.
3. Project teachers will develop building action plans for teaching metric education to other staff.	Agreement	3. Project teachers developed building action plans as evidenced by the finished product.

OBJECTIVE A

PART III

OUTCOMES

INTENDED	STATUS	OBSERVED
1. By May, 1981, project teachers will show a significant increase at the .05 level from pre- to post-testing on a course examination with the completed instruments submitted to the Title IV-C Evaluation Unit by June, 1981.	Agreement	1. Teachers who took the metric course showed a significant growth in their knowledge of metric as shown by the pre-post assessment results. (See Appendix B.) Differences on all items were at the .001 level of significance.
2. By May, 1981, project teachers will have completed developing action plans as measured by submission of the plans, which project director will review and make available to Title IV-C Evaluation Unit by June, 1981.	Agreement	2. The project director verified that all project school teams submitted action plans.

OBJECTIVE A

PART IV

PERFORMANCE AGREEMENT

OBSERVED INPUTS/OBSERVED PROCESSES

The acquisition of materials, an instructor, participants and a pre-post assessment instrument all contributed to the processes of taking the pre-post examination, developing building action plans and participating in a 30 hour course in metric education. Although there were two discrepancies in the input section, they did not adversely affect any of the processes.

OBSERVED PROCESSES/OBSERVED OUTCOMES

Completion of the observed processes which included attending a 30 hour course in metric education, taking the pre-post examination, and developing a building plan all contributed to the observed outcomes which included demonstrating a significant increase in metric knowledge and completing building plans used to guide metric education in the target schools.

OBJECTIVE A

PART V

SUMMATION

ANALYSES/CONCLUSIONS/IMPLICATIONS

Objective A which assesses the demonstration of knowledge of the skills and concepts taught in the course, was met. There were, however, two discrepancies in the input section. One of the discrepancies was that the intended number of participants from each of the participating schools did not enroll. The other discrepancy was that materials, i.e. metric kits, measuring instruments and reference materials which were ordered did not arrive at the project site until after the school year. The project managed to overcome the lack of materials by borrowing and making the needed items. Neither of the discrepancies had an adverse effect on the process section.

There were no discrepancies in the process section of this objective. The course was taught, the pre- and post examinations were given and the project teachers developed building action plans. The processes led to the agreement found between the intended and observed outcomes. The teachers demonstrated a significant increase in their performance on the assessment instrument upon completing the course and all project school teams submitted action plans to the project coordinator. This project demonstrates that teachers can be taught metric skills and concepts through inservice courses.

DECISIONS

This report will be forwarded to the Project Director, Grants Administration, the Superintendent and the School Board to aid them in their decision making concerning this project.

FINAL REPORT

PLANNING, MONITORING, AND IMPLEMENTATION (PMI)
EVALUATION MODEL FOR DECISION-MAKING

Reporting Form

Goal: To prepare teachers, students and community persons to use the metric system of measurement with facility.

Objective B: Given an opportunity to participate in a metric education course, the metric corps teachers will apply the skills and concepts taught in the course, as measured by at least 80% of the items checked off on a checklist designed by the project director and the external evaluators.

PART I

INPUTS

INTENDED	STATUS	OBSERVED
1. Five teachers from each of the targeted schools to participate in the program	Discrepancy	1. In the reorganization of regions, the project lost Spingarn and gained Anacostia. Registration forms showed that five teachers from each of the schools were selected to participate in the program. Five representatives came from all schools except Anacostia which sent three teachers who attended several of the class sessions.
2. Sufficient materials for all participants including metric kits, measuring instruments and reference materials	Discrepancy	2. Material that was ordered for this year was received after the year ended. However, the project director informed the evaluation team that the materials available in the schools and the regional educational center, which were observed by the team, were adequate to start the program.
3. Qualified mathematics instructor to teach the course	Agreement	3. A math resource teacher, who worked with the initial metric training program begun in the early 1970's by the Mathematics Department was hired to teach the course.

OBJECTIVE B

PART I (continued)

INPUTS

INTENDED	STATUS	OBSERVED
4. Specialists to assist project teachers	Agreement	4. The mathematics resource teacher in the elementary school and the Regional mathematics supervisors for the elementary and secondary levels were the specialists who assisted the project teachers.
5. At least one hour per week of formal metric instruction of students	Agreement	5. After receiving training teachers gave formal metric training to the students as indicated by check lists and lesson plans submitted by the teachers.
6. At least two hours per month of metric training of other adults including teachers, parents, and community volunteers	Agreement	6. After training was completed in April, training of other teachers was given in the schools and at the Regional office as shown in the agenda for the regional training and verified by the project director.
7. A monitoring record sheet for recording metric activities involving other teachers, parents and students	Agreement	7. A record sheet was designed by the project director and Title IV-C Evaluation Unit personnel. It was discussed with one teacher in each school who served as the key coordinating person. This record sheet or log was used in the schools.
8. A teacher checklist to record application of metric skills and concepts.	Agreement	8. Checklists observed by the evaluation team were used in the schools.

OBJECTIVE B

PART II

PROCESSES

INTENDED	STATUS	OBSERVED
1. Project teachers will attend a 30-hour course in metric education as indicated by attendance records.	Agreement	1. The course outline and registration list were presented to the evaluation team. The course outline contained the title, objectives and schedule for the course. The course met during the period of February 23 to May 21 for three hours each week. One class was observed by the Evaluation Team.
2. Project teachers will develop building action plans for teaching metric education to other staff.	Agreement	2. The project teachers developed the building action plans midway through the course. They were examined by the evaluators.
3. Project teachers will conduct sessions on metric education for other teachers and staff as indicated by observation and a review of records.	Agreement	3. Participation logs showed that teachers did conduct sessions on metric education for other teachers and staff.
4. Project teachers will conduct classes in metric education for students as indicated by observation and a review of records.	Agreement	4. Participants' logs and lesson plans showed that teachers did conduct classes in metric education for students.
5. Project teachers will keep monitoring records up-to-date.	Agreement	5. The log, acting as a monitoring instrument, was observed to be kept up to date, but showed that most of the intensive classroom instruction did not begin until May.

OBJECTIVE B

PART III

OUTCOMES

INTENDED	STATUS	OBSERVED
1. By May, 1981, at least 80% of the items on a checklist on application of metric skills and concepts will be checked off by project participants and the check lists made available to the Title IV-C Evaluation Unit by June, 1981.	Discrepancy	1. Although 83% of the teachers indicated that they had developed at least two of the skills under the four broad areas of linear measurement, mass measurement, capacity or liquid measurement and temperature, only 70% of the individual items were checked as having been taught. (See Appendix C.) Since the inservice training needed by the teachers in order for them to instruct their students did not occur until spring, teachers did not begin intensive classroom instruction until May.
2. Project records will show that project teachers have initiated the implementation of the building action plan, with the records made available to the Title IV-C Evaluation Unit by June, 1981.	Agreement	2. The project director verified that building action plans were implemented in all of the schools having project teachers. Project logs (see Appendix D for sample) included comments referring to action plans.

OBJECTIVE B

PART IV

PERFORMANCE AGREEMENT

OBSERVED INPUTS/OBSERVED PROCESSES

Although all of the participating teachers could not complete the training and new materials were not available, personnel, supplies, time and assessment records were sufficient to lead to the processes of teachers attending the course, developing action plans and conducting instruction in metric education for students and other staff. Monitoring records were kept up to date but showed that most of the classroom instruction did not start until the beginning of May.

OBSERVED PROCESSES/OBSERVED OUTCOMES

The processes of attending the course, developing building action plans and teaching the metric subject matter were observed to be carried out as indicated, but because of the late date in starting classroom instruction, teachers were unable to present 80% of the items on their checklists to their students. They did, however, develop at least two skills under each of the four general metric areas. They also initiated implementation of their building action plan.

OBJECTIVE B

PART V

SUMMATION

ANALYSES/CONCLUSIONS/IMPLICATIONS

Discrepancy in the inputs concerned with the number of staff receiving training and the late arrival of materials had no apparent adverse affect on the processes. What led to the discrepancy in the outcome and failure to meet the objective as written, was the lateness of the beginning of instruction in the classroom. This, in turn, was dependent on the completion of the 30 hour teacher training course. During the second year of the project, time lines can be adjusted so that objective B can be met.

DECISIONS

This report will be forwarded to the Project Director, Grants Administration, the Superintendent and the School Board to aid them in their decision making concerning this project.

FINAL REPORT

PLANNING, MONITORING, AND IMPLEMENTATION (PMI)
EVALUATION MODEL FOR DECISION-MAKING

Reporting Form

Goal: To prepare teachers, students and community persons to use the metric system of measurement with facility.

Objective C: Students of teachers who participate in a metric education course will demonstrate increased knowledge of metric measurement as measured by a significant increase pre- to posttest on a project developed multi-level instrument.

PART I

INPUTS

INTENDED	STATUS	OBSERVED
1. At least one hour per week of formal metric instruction of students	Agreement	1. After receiving training in the spring, teachers gave at least one hour of formal metric instruction per week as indicated by check lists and lesson plans.
2. Material including kits, measuring instruments and reference materials	Discrepancy	2. The materials arrived after school closed. However, the program was able to use some materials which were already in the schools.
3. Math labs in participating schools	Discrepancy	3. The schools are in the process of setting up the labs. Equipment was observed by the evaluation team.
4. Project development multi-leveled instrument.	Discrepancy	4. Each teacher developed his/her own instrument. These will become the basis for a group planning session to design one test to be used by all teachers at each grade level.

OBJECTIVE C

PART II

PROCESSES

INTENDED	STATUS	OBSERVED
1. Students will take the project developed instrument on metric measurement, in March and June	Discrepancy	1. Students were tested on individual teacher-made pre- and posttests. No general instruments were used.
2. Project teachers will conduct classes in metric education for their students.	Agreement	2. After the fourth session of the teachers' own classes, the teachers began conducting classes in metric education for their students as indicated by checklists and lesson plans.

OBJECTIVE C

PART III

OUTCOMES

INTENDED	STATUS	OBSERVED
1. By May, 1981, project students will show a significant increase at the .05 level pre- to posttest on the project designed multi-level instrument concerning metric measurement, with raw scores submitted to the Title IV-C Evaluation Unit by June, 1981.	*	1. The project designed multi-level instrument was not completed but each teacher developed some form of assessment. One teacher developed and administered a pre-post assessment instrument to her class. There was significance at the .001 level between pre- and posttest results on all items of the test. (See Appendix E.)

*Insufficient evidence available

OBJECTIVE C

PART IV

PERFORMANCE AGREEMENT

OBSERVED INPUTS/OBSERVED PROCESSES

The time was established as a minimum of one hour per week of formal instruction for students. Although materials did not arrive in time, there were some items in all the schools which could be used. Thus, project teachers were able to conduct classes in metric education for their students. Although there was no project developed instrument for all students, some teachers did design and administer assessment items.

OBSERVED PROCESSES/OBSERVED OUTCOMES

According to checklists and lesson plans, teachers did present the knowledge gained in their inservice to the students during the spring of 1981. The multi-level pre-post instrument for assessing all project students was not developed and thus there were insufficient data to measure outcomes. Assessment data were submitted by one class, however, and that sample showed a significant pre-post gain.

OBJECTIVE C

PART V

SUMMATION

ANALYSES/CONCLUSIONS/IMPLICATIONS

The discrepancies in inputs and processes were related to materials, equipment and assessment. Those teachers who completed the inservice during the 1980-81 school year provided instruction to students although later than planned. Those who took the inservice in 1981 will be ready to present the information to their own students early in the 1981-82 school year and to collect assessment data.

DECISIONS

This report will be forwarded to the Project Director, Grants Administration, the Superintendent and the School Board to aid them in their decision making concerning this project.

FINAL REPORT

PLANNING, MONITORING, AND IMPLEMENTATION (PMI)
EVALUATION MODEL FOR DECISION-MAKING

Reporting Form

Goal: To prepare teachers, students and community persons to use the metric system of measurement with facility.

Objective D: After having attended a workshop on metric concepts and skills, parents and community persons will demonstrate a positive attitude and interest toward metric measurement as measured by at least 80% indicating a more positive attitude on the posttest than on the pretest on a project-designed opinion survey and at least 25% of them assisting the schools in the implementation of the metric education program.

PART I

INPUTS

INTENDED	STATUS	OBSERVED
1. An average of 3 parents and community persons per school who have stated an interest in metric education	Agreement	1. More than 3 parents and community persons stated an interest in metric education as verified by the metric project director who attended some of the parent/community persons' workshops and talked to instructors.
2. Regional and local workshops planned for educating parents and community persons in metric skills and concepts	Agreement	2. Three metric workshops for parents and community persons were scheduled as evidenced by agendas of those meetings.
3. Space to conduct workshops	Agreement	3. The room used for the workshops was at Nalle. The evaluation team visited the room and observed some of the materials.

OBJECTIVE D

PART I (continued)

INPUTS

INTENDED	STATUS	OBSERVED
4. An opinion survey to measure interest and attitudes of workshop participants	Agreement	4. The opinion survey was developed by the project director with the Title IV-C Evaluation Team. The pre- and posttests were given to the parents and community persons and to a comparison group in the evaluation team's office.
5. Materials including kits, measuring instruments, and reference materials	Agreement	5. The materials needed to start the program were observed by the evaluation team.
6. Logs in participating schools for recording parent and community persons' participation in the metric education program in the schools.	Agreement	6. The log was devised by the project director and the Title IV-C Evaluation Team.

OBJECTIVE D

PART II

PROCESSES

INTENDED	STATUS	OBSERVED
1. Parents and community persons who sign up for the workshops will attend at least 2 two-hour workshops in metric educaation.	Discrepancy	1. As evidenced by sign-in sheets, 13 of the 15 adult volunteers attended two workshops.
2. Parents and community persons who have attended the workshops will work with students on metric education in the math labs and classrooms.	Agreement	2. The parents and community people helped in the math labs and classrooms after the third teacher session which was held in May as evidenced by log entries. They volunteered in two of the schools.
3. Parents and community persons will record visits in logs provided by the project director.	Agreement	3. The logs began after the third teacher session as observed by the evaluation team.
4. Rating scale will be administered by project personnel.	Agreement	4. The pretest of the opinion survey was given at the participants' first session and the posttest was given on May 1, 1981. The comparison group instrument was administered by the Title IV-C Unit in the fall of 1980.

OBJECTIVE D

PART III

OUTCOMES

INTENDED	STATUS	OBSERVED
1. By May, 1981, at least 80% of the parents and community persons who attended metric project workshops will indicate a more positive attitude pre- to posttest on the items on a project-designed opinion survey concerning attitude toward metric education, with completed instruments submitted by the project director to the Title IV-C Evaluation Unit by June, 1981.	Agreement	1. Although there was no statistically significant difference on a test of proportions, there was indication of more positive attitude by the volunteers pre- to posttesting, on 100% of the items on a project designed opinion survey. The indication was determined by comparing the actual direction (increase or decrease) of percent of respondents to the expected direction. (See Appendix F.) To determine the similarity of the volunteer group to the population at large prior to their workshops, their pretest results were compared to those of a non-involved sample of adults. Results showed that before training the groups were alike in their own attitude toward the use of metric but they differed on what and how children should be taught in this area. (See Appendix G.)
2. By May, 1981, at least 25% of the parents who attended metric project workshops will assist the schools in implementation of the metric education program, as recorded on logs kept in each school, with data submitted by the project director to the Title IV-C Evaluation Unit by June, 1981.	Agreement	2. Seven (or 54%) of the 13 adults who completed the metric project workshops assisted teachers with their metric programs in two of the participating schools as verified by the project director.

OBJECTIVE D

PART IV

PERFORMANCE AGREEMENT

OBSERVED INPUTS/OBSERVED PROCESSES

Parents and community persons signed up for the workshops which were planned to educate them in metric skills and concepts. Space and materials were available and a log to record participation was devised. These observed inputs led to the processes of the parents and community persons participating in the workshops and helping in the classrooms.

OBSERVED PROCESSES/OBSERVED OUTCOMES

After participating in the workshops, parents and community persons demonstrated a change of attitudes in favor of metric education. Many of them participated further by volunteering in the classroom, helping to implement the metric education program. The observed processes were in performance agreement with the observed outcomes.

OBJECTIVE D

PART V

SUMMATION

ANALYSES/CONCLUSIONS/IMPLICATIONS

There were no discrepancies in any of the areas (inputs, processes or outcomes) on this objective. Participants did change toward greater acceptance of the metric system as a measurement mode. Although they had a more positive attitude then the general population concerning children's learning more about metric education when they first volunteered, their own measurement mode was similar to non-volunteers in that they preferred non-metric measures. This changed, however, after exposure to the training, implying that adult workshops in metric are a good way to influence attitudes.

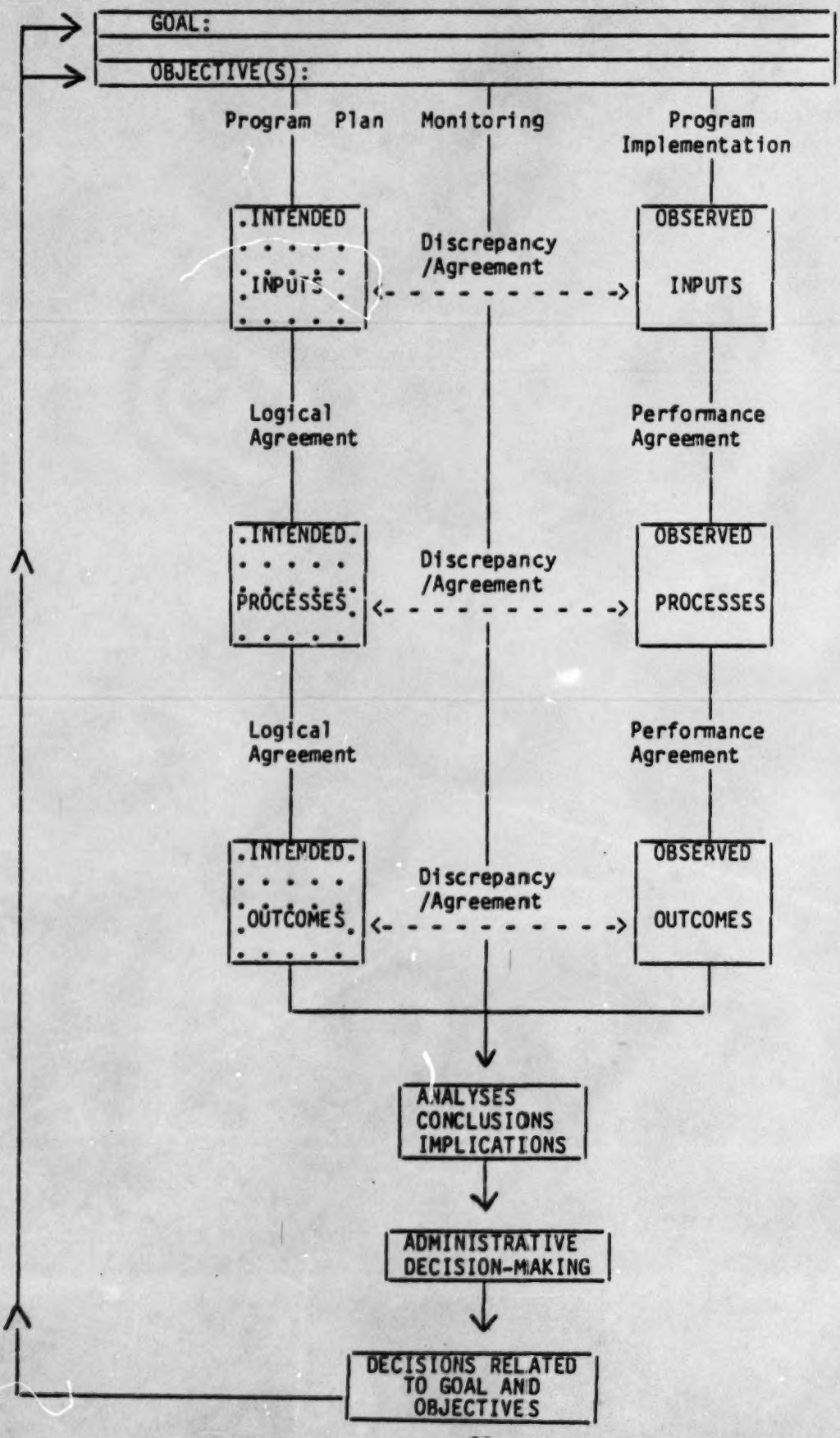
DECISIONS

This report will be forwarded to the Project Director, Grants Administration, the Superintendent, and the School Board to aid them in their decision making concerning this project.

APPENDIX A

EVALUATION MODEL SCHEMA

EVALUATION MODEL SCHEMA



APPENDIX B

PRE-POST ASSESSMENT OF TEACHERS

ESEA, TITLE IV, PART C PROJECT

MOVING TOWARD METRIC WITH A METRICATION CORPS

PRE-POST ASSESSMENT

(TEACHERS)
N=21

I. Complete each statement below:

A. Three basic units of metric measurement are:

	Pretest		Posttest		Significance of Difference Between Two Proportions Z	Level of Significance
	# Correct	Percent	# Correct	Percent		
1. linear -	6	29	21	100	4.85	.001
2. liquid -	6	29	21	100	4.85	.001
3. mass -	6	29	21	100	4.85	.001

B. The system of metric measurement is based on multiples of:

6	29	21	100	4.85	.001

C. The prefixes which are used with the basic units in metric measurement are:

1. one-tenth	6	29	21	100	4.85	.001
2. one-hundredth	6	29	21	100	4.85	.001
3. one-thousandth	5	24	21	100	4.99	.001
4. ten	2	10	21	100	5.38	.001
5. one-hundred	0	-	21	100	5.50+	.001
6. one-thousand	1	5	21	100	5.50	.001

II. Discuss at least one reason for learning and teaching metric measurement

	Pretest		Posttest		Significance of Difference Between Two Proportions Z	Level of Significance
	# Correct	Percent	# Correct	Percent		
A. _____	5	24	21	100	4.99	.001
B. _____	3	14	21	100	5.25	.001
C. _____	0	-	21	100	5.50+	.001
D. _____	0	-	21	100	5.50+	.001

III. List and describe at least five items which you would place in a metric lab in your school.

A. _____	6	29	21	100	4.85	.001
B. _____	6	29	21	100	4.85	.001
C. _____	6	29	21	100	4.850+	.001
D. _____	5	24	21	100	4.99	.001
E. _____	2	10	21	100	5.38	.001

IV. Describe strategies or develop a lesson plan for introducing your class to metric measurement.

Grade: _____

Objective: _____

Instructional Activities:

Step in Sequence: _____

_____

_____

Assessments:

_____

_____

_____

Scoring determined as follows:

12-15 points = number of persons X4

10-12 points = number of persons X3

7-9 points = number of persons X2

0-6 points = number of persons X1

Total possible = 21X4 (84)

Pretest		Posttest		Significance of Difference Between Two Proportions	Level of Significance
# Correct	Percent	# Correct	Percent	Z	
29	35	73	87	7.17	.001

APPENDIX C

METRIC SKILLS DEVELOPED WITH STUDENTS BY PROJECT TEACHERS

ESEA IV C

MOVING TOWARD METRICATION WITH A METRIC CORPS

TEACHER CHECKLIST
N=20

Please indicate by checking (X) those skills which you have developed with your students.

Linear Measurement	Number	Percent
1. Introduction to metric units for linear measurement	20	100
2. Application of metric units to measure length	20	100
3. Renaming metric units of linear measurement	20	100
4. Problem solving using linear measurement	18	90

Mass Measurement (Weight)	Number	Percent
1. Introduction to metric units for mass measurement	17	85
2. Application of metric units to measure weight	17	85
3. Renaming metric units of mass measurement	13	65
4. Problem solving using mass measurement	3	15

Capacity or Liquid Measurement	Number	Percent
1. Introduction to metric units for liquid measurement	18	90
2. Application of metric units to measure liquids	17	85
3. Renaming metric units of liquid measurement	2	10
4. Problem solving using liquid measurement	5	25

Temperature	Number	Percent
1. Introduction of the celsius scale	19	95
2. Application of a celsius thermometer to determine temperature	19	95
3. Problem solving using a celsius scale	2	10
Total Mean	14	70

APPENDIX D

PROJECT LOG FROM A PARTICIPATING SCHOOL

DISTRICT OF COLUMBIA PUBLIC SCHOOLS

Moving Toward Metrication with a
Metric Corps - ESEA Title IV-C Project

Participation Log

Date	Activity Code (See Accompanying List Under A)*	Objectives Code (See Accompanying List Under B)**	Participants		Comments
			Number	Classification Code (See Accompanying List Under C)***	
5/11/81	A-21		4	C-3	School metric corps met with principal to inform her of action plans for metric lab.
5/20/81	A-20	B-2	6	C-2	School metric corps met with faculty to inform and receive feedback of plans for metric lab.
5/26/81	A-10	B-2	57	C-1	The metric system was introduced to the students in grades one through six by the individual teachers.

PARTIAL LIST

*A-10 Class Session (Whole Group)
A-20 Orientation (Teachers)
A-21 Orientation (Administrators)

**B-2 (Objective) (Teachers)

***C-1 Participants (Students)
C-2 Participants (Teachers)
C-3 Participants (Administrators)

APPENDIX E

PRE-POST ASSESSMENT OF
STUDENTS IN ONE CLASS

Metric Education Pre-Post Assessment of Students

N=27

I. Directions: Read each statement below. Draw a circle around the correct answer for each statement.

	Pretest		Posttest		Significance of the Difference Between two Proportions Z	Level of Significance
	Number Correct	Percent Correct	Number Correct	Percent Correct		
a. Which of the following metric units would be used to measure your desk? meters liters grams	3	11	24	89	5.03	.001
b. Which of the following metric units would be used to buy milk? meters liters grams	2	7	25	93	5.51	.001
c. Which of the following metric units would be used to buy cheese? meters liters grams	0	-	23	85	4.97+	.001
d. Which of the following metric units would be used to measure the length of this room? meters liters grams	4	15	22	81	4.23	.001
e. Which of the following metric units would be used to measure the distance from Washington, D.C. to Baltimore? kilometers kiloliters kilograms	2	7	24	89	5.16	.001

II. Directions: Write true or false in the blank beside each item.

	Pretest		Posttest		Significance of the Difference Between two Proportions, Z	Level of Significance
	Number Correct	Percent Correct	Number Correct	Percent Correct		
_____ a. The meter is the metric unit for measuring volume.	1	4	26	96	5.99	.001
_____ b. The gram is the metric unit for measuring distance and length.	2	7	23	85	4.83	.001
_____ c. The liter is the metric unit for measuring volume.	0	-	25	93	5.63+	.001
_____ d. The gram is the metric unit for measuring mass.	0	-	26	96	5.99+	.001
_____ e. Celsius is the metric unit for measuring temperature.	10	37	27	100	5.26	.001
_____ f. The distance from New York to California would be measured in kilometers.	6	22	27	100	5.79	.001
_____ g. The height of a friend would be measured in kilograms.	0	-	27	100	6.36+	.001
_____ h. The weight of a friend would be measured in kiloliters.	0	-	27	100	6.36+	.001
_____ i. The weight of a penny would be measured in grams.	0	-	26	96	5.99+	.001
_____ j. A piece of cloth would be measured in meters.	0	-	27	100	6.63+	.001
_____ k. Your ring finger would be measured in centimeters.	0	-	27	100	6.36+	.001

III. Directions: Fill in the blank with the correct response.

	Pretest		Posttest		Significance of the Difference Between two Proportions, Z	Level of Significance
	Number Correct	Percent Correct	Number Correct	Percent Correct		
a. The metric unit for measuring length is _____	5	19	27	100	5.99	.001
b. The metric unit for measuring liquids is _____	1	4	26	96	5.99	.001
c. The metric unit for measuring weight is _____	0	-	26	96	5.99+	.001
d. The metric unit for measuring temperature is _____	7	26	25	93	4.83	.001

IV. State two reasons why you think the United States should use the Metric System.

Each student (27) gave two acceptable responses for this item

APPENDIX F

ATTITUDE SURVEY OF PARENTS AND COMMUNITY
PERSONS WHO ATTENDED PROJECT WORKSHOPS

DISTRICT OF COLUMBIA PUBLIC SCHOOLS
Division of Quality Assurance
Title IV-C Evaluation Unit - Metrication Project

Name: REGION D DATE: 1980-1981

OPINION SURVEY

Please respond to all of the items. There are no right or wrong answers. We are only interested in your opinions. if you have no definite choice, please check the one toward which you generally lean.

FOR EACH STATEMENT, PLEASE CHECK ONE RESPONSE.

	N=15 Pretest		N=13 Posttest			
	Number who Checked Item	Percent	Number who Checked Item	Percent	Expected Direction of Percent (Increase or Decrease)	Actual Direction of Percent (Increase or Decrease)
1. I prefer to buy milk by the						
☐ quart.	12	80	6	46	-	-
☐ liter.	3	20	7	54	+	+
2. It is easier to measure distance by						
☐ centimeters and kilometers.	4	27	8	62	+	+
☐ inches and miles.	10	67	5	38	-	-
3. I think that since we trade with other countries						
☐ the United States should change to the metric system.	8	53	10	77	+	+
☐ other countries should change to the U.S. system.	3	20	3	23	-	-
☐ all countries should keep their own systems.	4	27	0	0	-	-

	N=15 Pretest		N=13 Posttest			
	Number who Checked Item	Percent	Number who Checked Item	Percent	Expected Direction of Percent (Increase or Decrease)	Actual Direction of Percent (Increase or Decrease)
4. Students learn better to measure and weigh using						
☐ feet and pounds.	14	93	8	62	-	-
☐ meters and grams.	1	7	5	38	+	+
5. Children starting in school should be taught						
☐ both the metric and the U.S. systems.	6	40	1	8	-*	-
☐ only the U.S. system.	5	33	4	31	-	-
☐ only the metric system.	4	27	8	62	+*	+
6. Whether or not children are taught the metric system, I don't want to have to learn it.						
☐ Agree	1	7	0	0	-	-
☐ Disagree	14	93	13	100	+	+

*There may be some question on the expected direction of this item.

APPENDIX G

COMPARISON OF PRETEST OPINION SURVEY RESPONSES OF PARENTS AND COMMUNITY PERSONS WHO ATTENDED WORKSHOPS AND A NON-INVOLVED SAMPLE OF ADULTS

DISTRICT OF COLUMBIA PUBLIC SCHOOLS
Division of Quality Assurance
Title IV-C Evaluation Unit - Metrication Project

Name: REGION D DATE: 1980-1981

OPINION SURVEY

Please respond to all of the items. There are no right or wrong answers. We are only interested in your opinions. if you have no definite choice, please check the one toward which you generally lean.

FOR EACH STATEMENT, PLEASE CHECK ONE RESPONSE.

Pretest Results

	N=15 Workshop Members		N=25 Non-Workshop Adults			
	Number who Checked Item	Percent	Number who Checked Item	Percent	Significance of the Difference Between two Proportions, Z	Level of Significance
1. I prefer to buy milk by the						
☐ quart.	12	80	20	80	0.00	not
☐ liter.	3	20	5	20	0.00	not
2. It is easier to measure distance by						
☐ centimeters and kilometers.	4	27	7	28	0.06	not
☐ inches and miles.	10	67	18	72	0.41	not
3. I think that since we trade with other countries						
☐ the United States should change to the metric system.	8	53	14	56	0.16	not
☐ other countries should change to the U.S. system.	3	20	2	8	0.49	not
☐ all countries should keep their own systems.	4	27	9	32	0.25	not

	N=15 Work Participants		N=25 Non-Workshop Adults			
	Number who Checked Item	Percent	Number who Checked Item	Percent	Significance of the Difference Between two Proportions, Z	Level of Significance
4. Students learn better to measure and weigh using						
☐ feet and pounds.	14	93	16*	67	2.35	.05
☐ meters and grams.	1	7	8*	33	1.16	not
5. Children starting in school should be taught						
☐ both the metric and the U.S. systems.	6	40	25	100	5.46	.001
☐ only the U.S. system.	5	33	0	0	3.06	.01
☐ only the metric system.	4	27	0	0	2.74	.01
6. Whether or not children are taught the metric system, I don't want to have to learn it.						
☐ Agree	1	7	9	36	1.31	not
☐ Disagree	14	93	16	64	2.51	.05

*One person did not respond.